CLAIMS

I CLAIM:

1. A pharmaceutical composition, comprising a plurality of bone marrow stromal cells (MSCs) comprising an adenovirus mediated human BMP-2 gene, and a pharmaceutically acceptable polymer.

2. The composition as recited in Claim 1 wherein the polymer is selected from a group consisting of alginate and collagen.

3. The composition as recited in Claim 1 wherein the MSCs are present in a concentration of about 50 x 10^6 per ml of the polymer.

4. The composition as recited in Claim 1 wherein the polymer is Pancogene S.

5. A method of treating a bone or other tissue defect, comprising:

a. Obtaining a plurality of MSCs from a subject;

b. transferring a BMP-2 gene to the MSCs to form BMP-2 protein producing MSCs; and

c. implanting the protein producing MSCs to a site on the subject.

6. The method as recited in Claim 5 wherein the BMP-2 gene is transferred via an adenovirus.

7. The method as recited in Claim 5 further comprising mixing the BMP-2 producing MSCs with a polymer either before, during or after the implantation of the protein producing MSCs.

8. The method as recited in Claim 5 wherein the protein producing MSCs implanted are present in a concentration of about 50 x 10^6 per ml of a pharmaceutically acceptable polymer and produce an effective amount of the protein.

9. A BMP-2 protein at a site of bone or other tissue defect produced by the method of obtaining a plurality of MSCs from a subject, transferring a BMP-2 gene to the MSCs to form BMP-2 protein producing MSCs, and implanting the protein producing MSCs to the site on the subject.

10. The protein as recited in Claim 9 further comprising mixing the BMP-2 producing MSCs with a polymer either before, during or after the time of implantation of the protein producing MSCs.